

We claim:

1. A catheter for removing core material from one or more plaque deposits on an inside wall of a blood vessel, said catheter comprising:

an elongate shaft having a proximal end and a distal end;

an expandable member disposed about a portion of the elongated shaft proximate the distal end of the elongate shaft; and

a first collection lumen having a proximal end and a distal end, the distal end being disposed proximate the balloon.

2. The catheter of claim 1 further comprising a suction means fluidly coupled to the proximal end of the first collection lumen.

3. The catheter of claim 1, wherein the expandable member includes a balloon having an inflated state and a deflated state.

4. The catheter of claim 1, wherein the distal end of the first collection lumen is directed axially.

5. The catheter of claim 1, wherein the distal end of the first collection lumen is directed radially.

6. The catheter of claim 1, wherein the distal end of the first collection lumen is disposed proximal of the expandable member.

7. The catheter of claim 1, wherein the distal end of the first collection lumen is disposed distal of the expandable member.

8. The catheter of claim 1, wherein a wall of the first collection lumen is defined, at least in part, by a wall of the elongated shaft.

9. The catheter of claim 1 further comprising a second collection lumen having a proximal end and a distal end, the distal end being disposed proximate the expandable member.

10. The catheter of claim 9 further comprising a vacuum means fluidly coupled to

the proximal end of the first collection lumen; and

the proximal end of the second collection lumen.

11. The catheter of claim 9, wherein the distal end of the second collection lumen is directed axially.

12. The catheter of claim 9, wherein the distal end of the second collection lumen is directed radially.

13. The catheter of claim 9, wherein the distal end of the second collection lumen is disposed proximal of the expandable member.

14. The catheter of claim 9, wherein the distal end of the second collection lumen is disposed distal of the expandable member.

15. The catheter of claim 9, wherein a wall of the second collection lumen is defined, at least in part, by a wall of the elongated shaft.

16. The catheter of claim 9, wherein a wall of the second collection lumen is defined, at least in part, by a wall of the first collection lumen.

17. The catheter of claim 9, wherein one of the first or second collection lumen is a guidewire lumen.

18. A method for removing core material from one or more plaque deposits on an inside wall of a blood vessel, said method comprising the steps of:

providing a catheter having an elongate shaft with a proximal end and a distal end, an inflatable balloon disposed about a portion of the elongated shaft proximate the

distal end of the elongate shaft, one or more collection lumens each having a proximal end fluidly coupled to a suction means and a distal end disposed proximate of the balloon;

inserting the distal end of the catheter into a lumen of the blood vessel;

positioning the balloon proximate a plaque deposit;

inflating the balloon to engage the inner surface of the blood vessel and the one or more plaque deposits and rupturing the plaque deposits in one or more locations urging the core material from the plaque deposits;

collecting the urged core material from a location proximate of the balloon using the distal end of the one or more collection lumens; and

extracting the urged core material from the lumen of the blood vessel with suction means fluidly coupled to the proximal ends of the one or more collection lumens.